RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole 51-02-12

Log Event A

Borehole Information

Farm : TX	**Tank :** TX-102	**Site Number :** 299-W15-141
N-Coord : 41,696	**W-Coord :** 75,852	**TOC Elevation :** 672.22
Water Level, ft :	**Date Drilled :** 7/31/1971	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:
This borehole was drilled in July 1971 and completed to a depth of 100 ft using 6-in. casing. The drilling log does not mention if the borehole casing was perforated or grouted. Total logging depth achieved by the SGLS was 99.5 ft.

The casing thickness is presumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. steel tubing.

The zero reference for the SGLS logs is the top of the borehole casing. The top of the casing is flush with the ground surface.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 11/1995	**Calibration Reference :** GJPO-HAN-3	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 1/10/1996	**Logging Engineer:** Bob Spatz
Start Depth, ft.: 0.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 30.5	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 1/10/1996	**Logging Engineer:** Bob Spatz
Start Depth, ft.: 29.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 53.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 3	**Log Run Date :** 1/11/1996	**Logging Engineer:** Bob Spatz
Start Depth, ft.: 99.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 52.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Borehole 51-02-12

Log Event A

Analysis Information

Analyst : E.P. Baumgartner

Data Processing Reference : P-GJPO-1787 Analysis Date : 9/9/1996

Analysis Notes :

The logging of borehole 51-02-12 was completed in three runs using the SGLS. The field verification spectra recorded immediately before and after the survey operation met the acceptance criteria established for the peak shape and system efficiency, confirming the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A depth overlap, where data were collected by separate logging runs over the same depth interval, occurred in this borehole between depths of 29.5 and 30.5 ft and 52 and 53 ft. The concentrations of the natural radionuclides were calculated using both the original and repeated log data sets at the overlapping points. The calculated concentrations using the two separate data sets were within the statistical uncertainty of the measurements, indicating very good repeatability of the radionuclide concentration measurements.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected almost continuously from the ground surface to a depth of 22.5 ft. Detectable quantities of Cs-137 were less than 0.4 pCi/g between 25.5 and 26.5 ft, at 27.5 ft, and at the bottom of the borehole. All of the concentration values were less than 1 pCi/g, except for the values at the ground surface, 1, and 1.5 ft. The highest measured Cs-137 concentration was about 4 pCi/g at the ground surface. Cs-137 contamination was not detected between 27.5 and 99.5 ft in this borehole.

The logs of the naturally occurring radionuclides show a sharp increase in the K-40 concentrations from about 12 to 20 pCi/g at about 48.5 ft. The Th-232 log plot also has a slight increase in mean value at this depth. There is a marked decrease in the K-40 concentrations, and possibly the U-235 concentrations, between 73 and 75 ft.

The SGLS total count log plot reflects the log plots of the natural radionuclide concentrations and the contribution of the Cs-137 concentrations. There is a slight decrease in the total count plot at 91.5 ft. A sharp low at 74 ft reflects the K-40 log plot.

Details regarding the interpretation of the data for this borehole are presented in the Tank Summary Data Reports for tanks TX-102 and TX-106.

Log Plot Notes:

Separate log plots show the man-made (Cs-137) and the naturally occurring (KUT) radionuclides. The natural radionuclides can be used for lithologic interpretations. The headings of these plots identify the energy peak for the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainty for the calculated concentrations at the 95-percent confidence level. The MDL is shown by open circles on the plots. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

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The combination plot includes the man-made and naturally occurring radionclides, the total gamma count derived from the SGLS, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data with no attempt to adjust the depths to coincide with the SGLS data.